

REMARKS

Claims 1, 3, 5, 7, 11, 12-16, 22-24 and 26-28 were objected to due to a number of informalities. The claims have been amended to address the issues noted by the Examiner. Applicants noted other informalities in the claims and these have been corrected as well.

Claims 1-4 and 13-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Siddiqui in view of Bozinov. Applicants respectfully traverse and request reconsideration.

The method disclosed by Siddiqui requires the calculation of an internal marker image (i.e., included in the luminous spot area) and of an external marker image (see, page 928, left column third to the last line to right column line 12). Siddiqui further teaches a watershed transform over the two marker images for locating the contours of the luminous spots. Moreover, the internal marker image is obtained through two iterations of the alternating sequential filter (page 928, left column, near the bottom). These steps are necessary in Siddiqui in order to ensure that the contours of the spots are comprised between the internal and external marker images (page 928, right column, lines 8-9). Thus, it is clear that the teachings of Siddiqui's method work only if TWO marker images are obtained. Indeed, the watershed transform in Siddiqui is carried out on BOTH the internal and external marker images for generating an intermediate image that should reproduce the contours of the spots. Notably, this occurs in Siddiqui without filtering the background luminosity from the original image.

Turning now to Claim 1, Applicants claim "generating a corresponding marker image of the background" and "generating a filtered image from which the luminosity of the background is removed" in the context of "generating a binary map of pixels defining a boundary of each spot on the background." The claim thus focuses on generating a single marker image of the background and further filtering out the background luminosity from the original image. The objective of the claimed invention is to obtain an image in which the spots are in their original position but the background level is low. This is accomplished by determining the luminosity of the background through a reconstruction and a top-hat operation performed on that single marker image of the background.

There is no teaching or suggestion in Siddiqui, which focuses on and requires the use of BOTH the internal and external marker images, for the claimed invention. In fact, Siddiqui's method is much more onerous from a computational point of view because two marker images must be obtained. Siddiqui fails to teach or suggest "generating a corresponding marker image of the background" (since Siddiqui requires processing of TWO marker images including a non-background marker image) and "generating a filtered image from which the luminosity of the background is removed" (since Siddiqui does not filter out the background luminosity).

While Siddiqui mentions a top-hat operation relating to various techniques used in morphological methods of spot segmentation (see, page 927), there is no suggestion in Siddiqui for the use of such a top-hat operation to determine the contours of a spot from a single marker image of the background.

Bozinov does not address any of the deficiencies of Siddiqui noted above. There is no teaching or suggestion in Bozinov for generating a corresponding marker image of the background" and "generating a filtered image from which the luminosity of the background is removed" in the context of "generating a binary map of pixels defining a boundary of each spot on the background."

In view of the foregoing, Applicants respectfully submit that claim 1 is patentable over the cited prior art.

Corresponding apparatus claim 13 is patentable over the art for at least the same reasons as claim 1.

Claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over Siddiqui in view of Bozinov and Alessi. Claim 5 is patentable over the art for at least the same reasons as claim 1.

Claims 6-10, 17-21, 23 and 25-28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Siddiqui in view of Bozinov and Gardes. Applicants respectfully traverse the rejection.

The Examiner asserts that the claimed "calculating a characteristic value for each scanned pixel by a fuzzy logic algorithm ..." is taught by Gardes. In particular, the Examiner points to Gardes col. 8, lines 1-65 as meeting the recited limitations. Applicants disagree and request that the Examiner withdraw the rejection of Claims 6-10, 17-21, 23 and 25-28.

Applicants claim “calculating for said spot the mean value of grey level of the background pixels, said fuzzy logic algorithm using as antecedents: the grey level of a pixel; the distance between said grey level of the pixels and the mean grey level of the background pixels; and the square of said distance” (see, claim 6, similar limitations in claims 17, 21, 25 and 26). A review of Gardes col. 8, lines 1-65 fails to reveal any teaching or suggestion for the use of the claimed antecedents “the grey level of a pixel; the distance between said grey level of the pixels and the mean grey level of the background pixels; and the square of said distance” in connection with the execution of a “fuzzy logic algorithm” to make the recited calculation (for example, of the characteristic value as claimed). Applicants request that the Examiner more explicitly identify how Gardes meets the claim limitations. The unfocused citation to Gardes col. 8, lines 1-65 does not assist Applicants in understanding the nature of the Examiner’s rejection or how the Examiner is comparing the Gardes disclosure to the recited claim limitations.

Additionally, Applicants claim “recognizing said pixels as belonging to a same cluster if said characteristic value exceeds a preestablished threshold of grey level of the background pixels.” The Examiner again relies on Gardes col. 8, lines 1-65. Applicants’ review of Gardes fails to reveal any teaching for making a threshold of grey level comparison in order to recognize pixels as belonging to a same cluster. Gardes teaches grey level thresholding at col. 8, line 49, however this operation is performed improve image segmentation. There is no teaching or suggestion in Gardes for this operation being performed on grey level data obtained, as a result of the foregoing fuzzy logic with antecedents processing, as to background pixels. Applicants request that the Examiner more explicitly identify how Gardes meets the claim limitations. The unfocused citation to Gardes col. 8, lines 1-65 does not assist Applicants in understanding the nature of the Examiner’s rejection or how the Examiner is comparing the Gardes disclosure to the recited claim limitations.

In claims 17, 21, 25 and 26, Applicants further claim “calculating the mean value of grey level of the background pixels.” Again, the Examiner cites generally to Gardes col. 8, lines 1-65, but fails to specifically identify how Gardes teaches, the context of the claimed fuzzy processing, the claimed mean value calculation. Applicants request that the Examiner more explicitly identify how Gardes meets the claim limitations.

In view of the foregoing, Applicants submit that the Examiner has failed to make out the prima facie case for rejecting Claims 6-10, 17-21, 23 and 25-28. Gardes does not teach the explicitly recited limitations of the claims as asserted by the Examiner.

Claims 11 and 22 were rejected under 35 U.S.C. 103(a) as being unpatentable over Siddiqui in view of Bozinov, Alessi and Gardes. Applicants respectfully traverse the rejection and assert that these dependent claims are patentable over the art for at least the reasons recited above with respect to their respective independent claims.

In view of the foregoing, Applicants respectfully submit that the application is in condition for favorable action and allowance.

Dated: October 17, 2007

Respectfully submitted,

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